Nashville Fire Department

Fire Station Design Guide

for a typical 2 Bay, Suburban Fire Station.

Revised September 9, 2009

PURPOSE and SCOPE

We are dedicated to providing our fire service personnel first-rate fire stations; those stations serve a dual purpose.

First and foremost, they are emergency response facilities specifically designed to house apparatus, equipment and staff.

Second, the fire stations are a “home away from home” for our members; we must ensure they have a safe, quality environment in which to work, exercise, train and live.

The challenge is to design and construct a building that is a high quality, commercial structure with the qualities and comfort of a one family, residential occupancy.

This guide was developed to help Architects, Engineers, Construction Contractors and Sub-Contractors understand the specific requirements for a fire station for the Nashville Fire Department. Our standards are outlined in this **Fire Station Design Guide** and, while not all inclusive, we have included specifications for certain items. Designers must consult current building codes for more specific requirements for general construction.

American’s with Disabilities

All design, construction activities and services provided shall be completed in full compliance with the American’s with Disabilities Act (ADA) and Architectural and Transportation Barriers Compliance Board, Federal Register 36 CFR, Parts 1190 and 1191, Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Proposed Rule, published in the Federal Register on July 23, 2004, as has been adopted by the Metropolitan Government.

http://www.nashville.gov/gsa/ADA/ada_compliance.htm

Privacy Statement

Some information contained in this document may contain security related details which would be private and considered not for public record. Therefore, this document is considered private and not open for public review. Agencies provided this document as part of a design, bidding or construction project will not disclose the contents of this document with any other party without the written authorization of the Nashville Fire Department’s construction representative (or his/her approved designee).

Definitions

Approved Equal means the brand and model (when specified) has been approved for use in a Fire Station environment; **any deviation from the brand/model listed must be pre-approved by Fire Department management prior to design completion.** When a brand name is used it is for the purpose of describing the standard of quality, performance, and characteristics desired and is not intended to limit or restrict competition.

Apparatus refers to the various types of vehicles used by the Fire Department (see table in Chapter Two (2) for specific information on vehicles).

Bunker Gear/Turn Out Gear (see Structural Fire Fighting Ensemble).

Construction Representative (CR) is the person(s) representing Metropolitan Government (Metro). This person could be an employee of Metro or a contract employee. They will consult with the Fire Department representative in all matters regarding design and construction. Generally, this person is the Project Manager for Metro.

Double Deep refers to the interior length of an apparatus bay. This dimension may vary from bay to bay within the same station, especially in a larger fire station. *Example: An engine is 32.5' long- add approximately 6.0' front and rear for access and the length becomes 44.5'. A double deep bay will be 89' long to allow for two engines to park in the same bay* (see Table in Chapter Two (2) for specific information on vehicles).

EMS means emergency medical service. The term can refer to a vehicle (ambulance) or disposable and durable medical supplies.

LEED: Leadership in Energy and Environmental Design. "LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality." http://www.usgbc.org

NFPA is the National Fire Protection Association. Documents can be purchased from the NFPA by contacting them at 1 Berrymatch Park, Quincy, Massachusetts. Telephone number 1-800-344-3555 or 1-617-770-3000. http://www.nfpa.org

NSF is the National Sanitation Foundation International. P.O. Box 130140, 789 North Dixboro Road, Ann Arbor, Michigan 48113-0140. 1-800-NSF-Mark (1-800-673-6275) http://www.nsf.org
Structural Fire Fighting Ensemble is the safety clothing used by a firefighter for protection from heat, smoke and related compounds, blood and body fluids, etc. It includes a coat (with a liner), pants (with a liner), boots, gloves, fire resistant hoods, face shield or goggles and helmet.

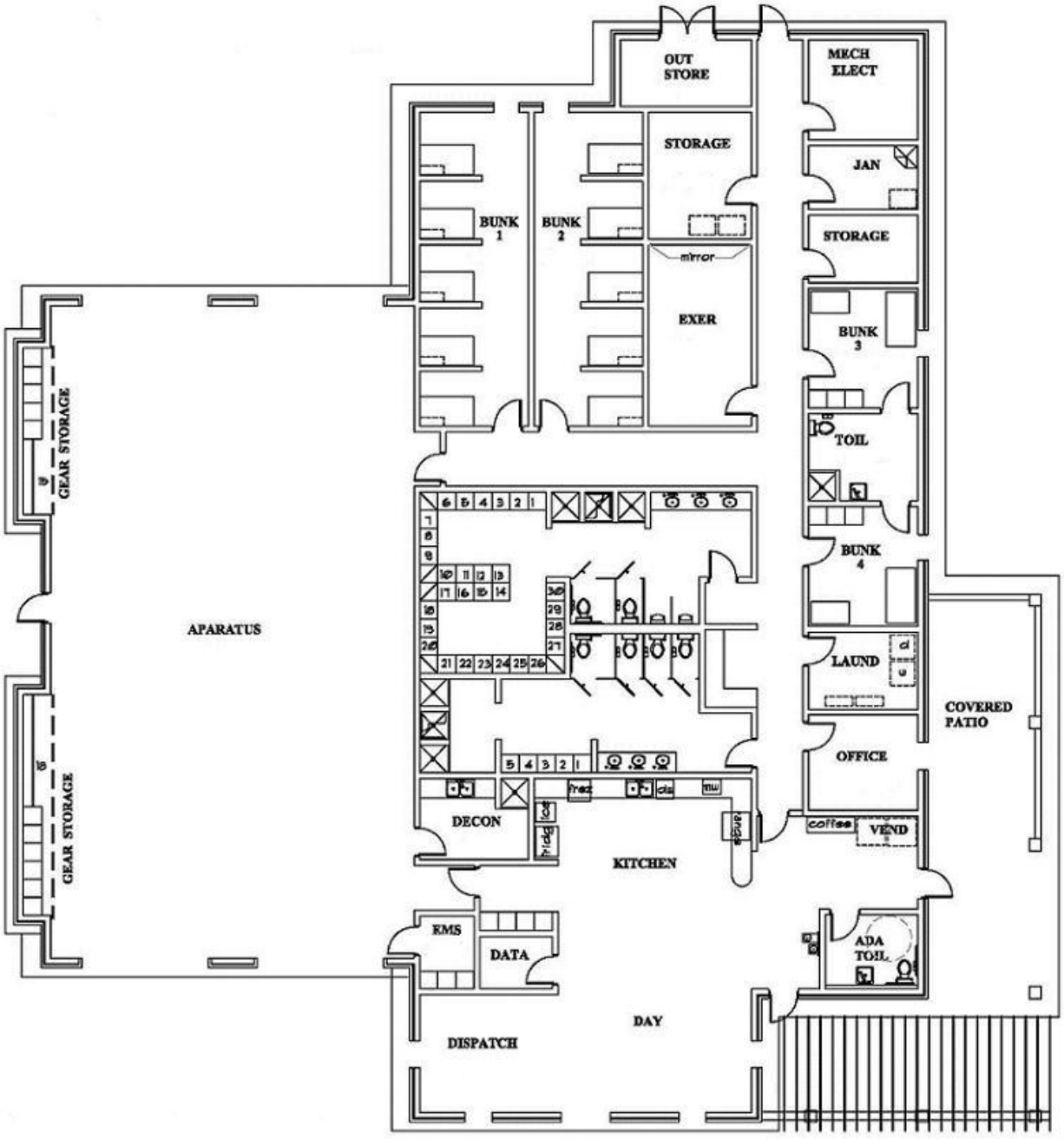
TIA/EIA-607-1995 Commercial Building Grounding and Bonding Requirements for Telecommunications: This standard defines grounding and bonding requirements for telecommunications cabling and equipment. The Telecommunications Industry Association (TIA) and the Electronic Industries Association (EIA) cabling standards define how to design, build, and manage a cabling system that is structured, meaning that the system is designed in blocks that have very specific performance characteristics. The blocks are integrated in a hierarchical manner to create a unified communication system. This document can be purchased from the TIA at: http://www.tiaonline.org/standards

TYPICAL SPACE NEEDS FOR A SUBURBAN FIRE STATION
WITH TWO APPARATUS

		Estimated Square Footage
Apparatus		
1	2 Apparatus Bays - Double-Deep (89' by 40')	**3560**
Response Support		
2	Bunker Gear Room	150
3	EMS Clean Storage	120
4	General Storage Room	100
5	Decontamination Room	150
6	Laundry	150
	Subtotal - Response Support	**670**
Public/Administration		
7	Watch Area	150
8	ADA Toilet Rooms (Unisex Preferred)	125
9	Kitchen w/ Pantry	250
10	Dining	300
11	Day Room	400
12	Private TV Room/Quiet Room	150
	Subtotal - Public/Administration	**1375**
Private/Living		
13	2 Captain's Bunk Rooms w/shared bath	300
14	3 Bunk Rooms (5 bunks per room)	1275
15	EMS Bunk Room	300
16	Male Bathroom	400
17	Female Bathroom	400
18	Locker Room/Changing Area Male & female	600
19	Exercise Room	300
	Subtotal - Private/Living	**3575**
Miscellaneous Spaces		
20	Janitors Closet	50
21	Mechanical Room (HVAC)	250
22	Mechanical Room (Electric Service Entrance)	75
24	Outdoor Storage Room	100
25	Low Voltage Room	60
26	Sprinkler Room	100
	Subtotal - Miscellaneous Spaces	**635**
	<<Subtotal - Square Footage >>	**9815**
Circulation & Walls		
10%	Circulation	982
6%	Walls	589
	Subtotal - Circulation & Walls	**1570**
	Total Square Footage	**11,385**

Note: A specific space needs analysis can be provided for each Fire Station project by the CR when requested.

NASHVILLE FIRE DEPARTMENT
TWO-BAY FIRE STATION
Schematic Design Example



This is provided for a visual example only and is not intended to be the floor plan as the requirements have changed slightly and other configurations could be better suited. This example shows a pergola covered front entrance; the Fire Department prefers a covered porch.

CHAPTER 1

A. PURPOSE

This design guide provides the basic criteria to evaluate, plan, and design fire station facilities for the Nashville Fire Department. This information is intended to make fire department staff, consultants, designers, architects and engineers aware of the unique functional requirements for the facilities, and to provide a basis for developing fire station projects.
All Fire Department facilities must comply with NFPA 70, *National Electric Code*, NFPA 1581, *Standard on Fire Department Infection Control Programs 2005 Edition*, T.C.A. 4-24-301-303, The American's with Disabilities Act (ADA) and the building codes applicable at the time construction permits are issued or as the code may require.

It is the policy of the Metropolitan Government to finance, plan, design, construct, maintain, and decommission its facilities and buildings to be sustainable. Project teams shall apply the relevant portions of the Metropolitan Government's Sustainable Development Design Guidelines and develop goals that increase the environmental, social, and economic benefits of the project. Projects shall be designed and built to achieve the LEED Silver rating at a minimum. Even though projects may be exempt from Metropolitan Government's sustainable development design guidelines, project teams are required to complete a LEED Project Scorecard as an evaluation of each project's sustainable design potential. (Ref. Ordinance No. BL2007-1374) The intent is to create an environment with a high level of operational efficiency, as well as comfort and support for building tenants and visitors.

The Architect shall define and develop design requirements for the project that include sustainable planning and design concepts, as defined by the U.S. Green Building Council's LEED Program, covering items such as:

- Building design analysis and building performance as it relates to energy use, sustainability concepts, and productivity of the interior environment;
- Energy use effectiveness including natural convection in HVAC, natural lighting and water use / recycling / integration;
- Development of integrated systems for environmentally responsible architecture.

The Architect, Consultants and Contractors shall develop all necessary documentation for the level of certification sought by the Owner and shall assist with submission to the U.S. Green Building Council.

The upgrade and renovation of existing fire stations and the proper planning, programming, and design of new facilities must ensure the safety of all station personnel and visitors.

B. DESIGN GUIDE SCOPE AND USE

This design guide is for a two (2) bay, suburban fire station with a total of forty (40) staff members; it applies to existing and future fire stations. Designers must take into consideration this facility will be used twenty four hours per day, seven days a week (24/7) for a minimum of fifty (50) years. Criteria for determining project requirements, site evaluation and planning and overall facility design should be used in addition to other documents provided during the RFP phase. It is intended to supplement existing informational resources needed to identify project requirements and successfully prepare project designs. Further information on individual projects and design requirements must be obtained from the individual project RFP documentation.

This design guide is not intended to restrict design to single-story facilities only, although single story structures are preferred. Site circumstances might require the use of two-story structures.

C. FIRE STATION OVERVIEW

Space requirements vary for different stations. The number and types of firefighting, supervisory and emergency medical service vehicles used at each station are determined by the Fire Department's Standard of Coverage criteria; response time analysis, the makeup of the primary response area and the demand for service. These factors also dictate the number of personnel required to operate these vehicles.

D. GENERAL DESIGN AND BUILDING SYSTEMS GUIDELINES.

- In addition to the normal codes and regulations that apply to all projects, NFPA 1581 *Standard on Fire Department Infection Control Programs* and T.C.A. 4-24-301-303 provides additional requirements for the design and construction of fire stations.
- All living spaces are to be kept to one side of the building and not split by the apparatus bays.
- Provide complete separation of staff and public parking and emergency vehicle/apparatus ramps when possible and as the site permits.
- Design the administrative and personnel living areas to reduce noise impact from the apparatus room, vehicle access ramps and street traffic.
- All interior ceilings to be drywall attached to the bottom of the roof trusses, where possible, with secure access doors.
- Provide an automatic sprinkler system throughout with smoke detectors in all sleeping areas. Smoke detector activation sounds an alarm through the fire station.
- All alarms (smoke, heat, water flow, etc.) will be remotely monitored by the approved vendor for Metropolitan Government. Installation of all systems must include the necessary hardware and/or software, wiring and conduit to make remote monitoring possible.
- Heat detectors are hard-wired to the fire alarm system and activate the alarm throughout the station.
- Provide a fire detection/suppression annunciator panel for the building in the Watch area. The annunciator panel should indicate the location of detectors that have activated.
- Provide an automatic, 60Hz, Diesel powered, 150Kw (minimum) emergency generator with capability to power all doors and lighting in apparatus room, bedrooms, restrooms, day/dining rooms, kitchen, mechanical equipment (HVAC), exterior lighting (including limited parking area lighting) and other areas based on local needs. The fuel capacity of the generator must allow operation of the generator, under full load, for a minimum of one week (7 days) prior to refueling. Generator must be tested under full load conditions and fuel tank topped off (full) prior to acceptance by the Fire Department. Engine to be a Cummins or Detroit Diesel. http://cumminspower.com
- The annunciator or remote alarm panel for the generator must be located in the Watch area. The panel must include a visual and audible alarm for low fuel and operational test failure, at a minimum.
- The emergency generator shall meet requirements of the most current editions of NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines* and NFPA 110, *Standard for Emergency and Standby Power Systems*.
- Thermostat controls for HVAC system must be located in the low voltage room. Sensors must be used throughout the facility to determine demand/call for conditioned air.
- General lighting should be two feet by four feet (2'X4') fluorescent with low temperature, energy-efficient ballasts and lamps, as applicable. The only exception is the Structural Firefighting Ensemble (SFFE) storage room (bunker/turnout gear). This room must have incandescent lighting or lighting approved, in writing, by the SFFE manufacturer.
- Low voltage (data, CATV, telephone) and the electrical entrance service for the building (3 phase) must be in separate rooms. Building electrical entrance service will terminate in an "electrical" room through conduit placed underground. This room must be located on an exterior wall with exterior access only. Low voltage must terminate by underground conduit and this room should be located on an exterior wall with interior, card key controlled access.
- All mechanical rooms must be on an exterior wall with exterior access. Doors should be oversized (42"-48") to allow for addition or removal of installed equipment. Low voltage conduit must be provided to allow for data transmission to a remote site and for voice

communication from within the mechanical room. A hose bibb must be located within 10' of the mechanical room entry door.

- All wet areas such as bathrooms, kitchen, laundry and decontamination room must have an independent water cut off.
- All drains must have a clean out access. All bends must be sweeping bends; they must not contain any tees or hard 90 degree turns.
- Provide a standard grease interceptor; a large-capacity underground vault with at least two chambers installed on the gray water discharge from a kitchen facility. Interceptor to be installed outside the building as near as possible to the source of oil/grease. The vault must have manhole openings in the top to allow access for cleaning, inspection of vault components and visual inspection of all interior baffle tees. Vault capacity should be determined using a calculation provided in the Uniform Plumbing Code (see the most current version of UPC for calculation). The vault also must meet the standard specifications, if any, of the Metropolitan Codes Department.
- There shall not be any exposed conduit or wiring. An exception is the interior of the mechanical room.
- Provide and coordinate items such as conduit, power, card readers, exterior emergency phone, etc. as specified by Metro Information Systems.
- Designers and contractors will incorporate and coordinate all Owner provided information such as voice, data and security information on all plans.

E. GENERAL MATERIALS SPECIFICATIONS.

There are products used in multiple spaces throughout the building and therefore specified once to avoid conflicts. Specific product details such as sizes may be specified under the individual spaces.

- All stainless steel countertops, sinks, food preparation tables and cabinets shall be constructed in conformance with the National Sanitation Foundation, International (NSF) and the American National Standards Institute (ANSI) Standard 2 (**NSF/ANSI 2-2002**) as adopted June 24, 2002 and shall bear the mark of the NSF. **All stainless steel construction to be Type 304, No. 4 mill finish**. **All joints are to be fully welded, ground smooth, polished, and finished. Double pan doors and drawers are to be tack welded and silicone sealed.** All units to be by Nutrionics, Inc., Parsons, TN, 800-844-3161, or an approved equal. http://www.nutrionics.com
- Countertops shall be constructed of 14 gauge stainless steel. All coves and corners shall have a minimum 1/4 inch diameter radius. Where adjacent to walls, tops shall have a 4-inch high overall splash with a 1-inch deep, 90 degree return to the wall and a 1-2-inch turndown at wall. Free edges shall have a 2-inch overall turndown with 1/2-inch turn under on a 45-degree angle. Where sinks are integral with countertops, there shall be a 1/2-inch, 45 degree marine edge with 2-inch overall turndown with 1/2-inch turn under on a 45 degree angle. Enclose end splashes.
- Sinks shall be fabricated from 14 gauge stainless steel with 1/2-inch diameter radius in all coves and corners. **Sinks shall be integrally welded to countertop, ground, polished, and blended, unless otherwise noted.**
- Stainless steel counter bases shall have a 1-1/4-inch square tubular skeletal frame around perimeter and as support for countertops. The base shall have an 18 gauge stainless steel body wrap. Cabinets shall have a 6 inch high, 12 gauge, galvanized iron toe kick perimeter. Base shall extend to all adjacent walls, but shall be recessed 3-inches underneath cabinet base at free edges. Wall units shall have provision for attachment to "z" strip leveling bar at rear of cabinet to allow for proper hanging of unit. Units to have appropriate "u" channel bracing as required to bear load. Wall cabinet units shall have a cap constructed of 18 gauge stainless steel and be flat. Internal shelves to be constructed of 18 gauge stainless steel. Intermediate shelving shall be fitted with pilaster to allow for height adjustment. Cabinet doors shall be constructed of 18 gauge stainless steel, insulated, and have double pan construction. All hinges shall be recessed. Drawers shall have a face of 18 gauge stainless steel; insulated and double pan construction.
- Metal lockers to be as manufactured by Penco Products, Inc., 2024 Cressman Road, P.O. Box 158, Skippack, PA 19474-0158, 1-800-562-1000, 1-610-666-0500, Fax 1-610-

666-7561, Vanguard Lockers with recessed pockets, or approved equal. Lockers to be 24" W x 24" D x 72" H, single door. Color to be 028 Gray or other manufacturer's standard color. All lockers shall be vented at both the top and bottom of the door. Tops and shelves to be specified further under each applicable section. http://www.pencoproducts.com

- Door hardware to be Grade 1 ANSI/BHMA A156 certified. All door locksets must accept BEST core lock cylinders.
- All lock cylinders to be Best Access Systems, Indianapolis, IN, 317-849-2250, **no substitutions**. Key schedule to be done per the Nashville Fire Department's master key schedule. Contractor must provide a minimum of 40 keys (one for each staff member). http://www.bestaccess.com
- All lockers shall be provided with Best Access System padlocks, Model number 11B-72T, order # 29009-117353. Padlock cores will be configured based upon the Fire Department's master key schedule. http://www.bestaccess.com
- Provide heavy duty latch protectors, minimum of ¼" thickness, on all doors to service areas; mechanical, electrical, exterior storage rooms, etc.
- Wire shelving units, chrome finish, with adjustable shelf brackets shall be as manufactured by Mortech Manufacturing Co, 411 North Aerojet Avenue, Azusa, CA, 800-410-0100, Fax 626-334-1704 or approved equal. Sizes and number of shelves to be specified under each applicable section. http://www.mortechmfg.com
- Hand dryers to be Excel, Xlerator, XL-C surface mounted hand dryer, or approved equal. Chrome-plated, 1/8-inch thick minimum, grey iron casting finished in high gloss, acid-resistant, multi-coat vitreous enamel. Equipped with 2 position, self-returning, chrome plated air outlet nozzle. Cover fastened to mounting base by 2 concealed vandal-resistant, recessed hexscrews. To be supplied in all restrooms or other areas as specified. http://www.exceldryer.com
- Provide horizontal metal slat louver blinds, manual control or raise and lower by cord; blade angle adjustable by control wand, Model Décor aluminum 1-inch mini-blind as manufactured by Hunter-Douglas, or approved equal. http://www.hunterdouglas.com
- Epoxy floor system to be Dur-A-Quartz, 1-800-253-3539 or approved equal. http://www.dur-a-flex.com
- All faucets, flush valves and fixtures must be automatic (electronic) or be foot operated. See NFPA 1581. http://www.electronicfaucets.com or an approved equal. All fixtures must have an independent water supply cut off.
- All painted surfaces to be coated with two (2) coats primer and epoxy acrylic enamel paint according to the manufacture's recommended application rates. Colors to be determined by the Fire Department representative prior to application. http://www.rustoleumibg.com/images/tds/S16_SP-11_210771.pdf

CHAPTER 2

When planning and programming for fire stations, functions fall into three main categories; apparatus, administration, and the general residential or 'living' areas.

FUNCTIONS

1. APPARATUS

APPARATUS BAYS - Enclosed area to house fire protection, EMS, Administrative or support vehicles.

- Bay area to be two (2) bays wide (40') and double deep (89').
- Provide ample circulation room around perimeter of apparatus to allow doors of apparatus to remain open and around the back and front of each piece of apparatus for quick response. (approximately 10' in the front and rear, 12' between apparatus and 6' on each side of the apparatus)
- Apparatus Specifications are as follows:

Vehicle	Length	Width	Height	Weight
Medic Unit / Ambulance	24'-0"	9'-8"	9'-0"	14,140 lbs.
Ladder / Tower truck	61'-0"	10'-0"	13'-0"	74,000 lbs.
Engine	32'-3"	8'	10'-6"	32,180 lbs.
Support Unit / Ford F-450 pick-up	24'-0"	7'-6"	6'-6"	2,000 lbs
with 300 gallon water tank				4,400 lbs.
Rapid Triage Unit	17'-6"	6'-6"	4'-8"	3,917 lbs.
Command Vehicle (Tahoe)	16'-6"	6'-6"	6'-6"	5,050 lbs.
Pumper/Tanker	34'-5"	8'	11'-6"	66,800 lbs.
Air Truck	28'-1"	8'	9'-4"	22,000 lbs
Heavy Rescue	33'-0"	8'-0"	10'-5"	29,920 lbs.
Hazardous Materials Truck	34'-7"	8'-0"	10'-3"	29,920 lbs.

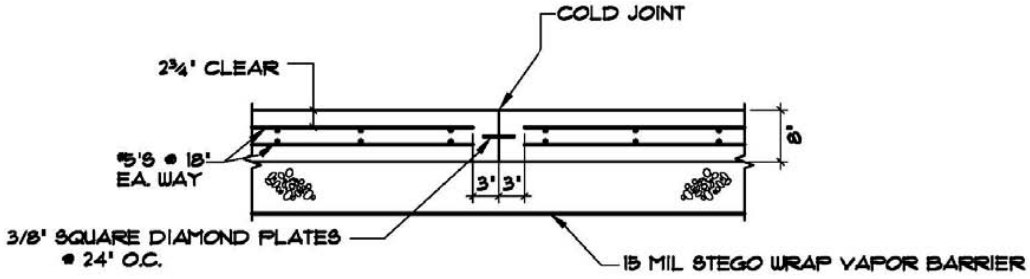
Fire Department apparatus requires turning radius of 25' inside and 50' outside. See NFPA 1141 for more information. If needed, detailed specifications for each vehicle are available from the Fire Department.

- Walls should be as flush as possible with little or no equipment or fixtures protruding. Recess items such as water spigots, hose reels, fire extinguishers, etc. whenever possible.
- Slabs in apparatus area to be sealed concrete (no integral color or stain required). See concrete specifications.
- Provide floor drains and not trench drains. Floor drains shall not to be located in high traffic areas; must be located underneath parked apparatus.
- Provide positive slope to the floor drains. Must comply with ADA slope tolerance.
- Provide enough clear space (minimum 7') between the top of the apparatus and the ceiling to allow fire fighters to work on top of the apparatus.
- Provide at least two exits/entries to the Living Quarters.
- All walk doors opening into the bay area shall be recessed so as not to overlap bay circulation areas and open apparatus doors.
- Provide built in training support by providing anchors and support in the apparatus bay ceiling for rappelling/climbing rope where possible.
- Provide night lighting in bay area that remains on 24/7.

- Provide four overhead electrical drops for the apparatus; one at each end of the vehicle bays. **Locations to be determined in the field (generally on the driver's side of the vehicle just behind the door). Must be noted on construction documents.** Each drop must be on a dedicated, 20A circuit. Install an inline, GFCI with manual reset on each cord. Grainger/Power1 First, item # 5YL46 or an approved equal; available from various sources. http://www.grainger.com/Grainger/items/5YL46
- Provide four (4) sectional overhead doors, minimum size of 14'0"x14'0".
- Bay doors are to be Thermacore 591 Series by Overhead Door Corporation or Clopay Model 3720 or an approved equal, with (1) Full Vision Section, Bronze Powder Coat finish - color: #RAL7013 for Overhead Door, Brown for Clopay (color may differ slightly depending on design); 3 inch Track and Hardware; Full Perimeter Weatherstripping; Cable Safety Device; Electric Operation with Photo Eyes (mounted 18"- 24" A.F.F.); Key Lockout 3 button, interior control station; Receiver/Transmitter (1 – per door); Chain Hoist. http://www.overheaddoor.com http://www.clopaydoor.com
- Overhead door operators as manufactured by ZAP, Cannock, Staffordshire, UK, www.zap-uk.com. Model 8855 ZAP Turbo with the FS (Fire Station) option. Provide two sets of ruggedized remote operators for each door: ZAP model MPT 1340. Each operator must be on a dedicated 20A circuit. (I have contacted ZAP and they are getting someone here in the US to contact me)
- Provide natural gas fired unit heaters for heat and provide for some minimal cooling and or ventilation.
- Apparatus has equipment to hold exhaust until it exits the bays. Provide for some exhaust ventilation, preferably an automatic system with a manual override.
- Apparatus Bay Concrete
    - Sub grade must be evaluated by a geotechnical engineer prior to slab work. All unsuitable materials must be removed prior to slab work and base must be prepared as recommended by the geotechnical engineer. Geotechnical engineer must submit a statement of acceptance.
    - Vapor Barrier must have all of the following qualities: Permeance of less than 0.01 Perms [grains/(ft2 *hr * in.Hg)] per ASTM F 1249 or ASTM E 96. ASTM E 1745 Class A.
    - Vapor Barrier products and accessories: Stego Wrap Vapor Barrier (15-mil), Stego Tape, Stego Mastic all as manufactured by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com. Or equal product that meets all performance criteria. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.
    - An 8" thick base of crusher run stone shall be placed on the Vapor Barrier. The base must be thoroughly compacted and rolled with a vibratory roller. Surface shall be smooth, and hard.
    - Poured in place Concrete Slab: 8" thick concrete slab with 2 curtains of reinforcement consisting of #5's @ 18" on centers each way; Steel reinforcing bars: ASTM A 615, Grade 60; Portland Cement: ASTM C 150 Type I/II; Fly Ash: ASTM C 618, Class C; Normal Weight Aggregates: ASTM C 33, uniformly graded, 3/4" maximum size; Chemical Admixtures shall be certified compatible and shall not contribute water soluble chloride ions exceeding those permitted in hardened concrete; Concrete shall have a 28 day strength of f'c = 5,000 psi; Water cement ratio shall be limited to 0.45; Slump Limit 2"-4" prior to adding water-reducing admixture or plasticizing admixture; Air Content less than 3%.
    - Slab shall be poured in approximate square dimensions of not greater than 40 feet between cold joints. Joints shall be unkeyed and use 3/8" thick by 4 1/2" square diamond shaped load plate dowels at 24" on centers.
    - Diamond Shaped Load Plate for Construction Joints acceptable product: PNA Diamond Dowel® System. Material: diamond shaped load plate:

3/8" saw cut from hot rolled steel plate meeting ASTM A 36. 3/4" saw cut from cold rolled steel plate for acceptable tolerances meeting ASTM 108-03 grade 1018. Pocket former: High density plastic with internal collapsible fins and spacer that hold diamond shaped load plate in correct position and creates a void to its vertical faces. This void, in addition to its tapered shape, shall allow for differential movement and shall prevent horizontal stress accumulation at joint, thus reducing likelihood of random cracking. REFER TO ACI 302.1R-04 FOR SELECTION OF PLATE SIZE AND SPACING. Dimensions of plate: 3/8" by 4-1/2" by 4-1/2".

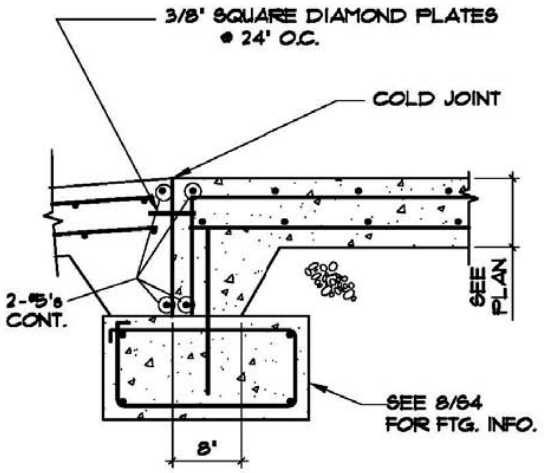
- Slab Installation: Finishers shall have a proven record of placing successful industrial quality slab on grade. Equipment slab shall not be placed until roof is in place in the area. Sun, wind and rain shall be controlled during placement and curing of the slab. The slab shall be continuously wet cured for a minimum of 28 days. The slab shall be protected during construction against abrasion, impact and wear prior to being turned over to the owner. The concrete slab should be sealed or finished as desired by the owner.



CONTROL JOINT

SLAB ON GRADE JOINTS

SCALE: 1½" = 1'-0"



EXTERIOR DOOR SECTION

SCALE: 1" = 1'-0"

2. RESPONSE SUPPORT

BUNKER GEAR ROOM – Provides for storage of SFFE. Self Contained Breathing Apparatus (SCBA) tanks are replenished to the stations as needed and no additional storage is required at the stations for SCBA. SFFE is sent out for laundering and not done at the stations. Fire hose storage or drying areas are not required at the stations.

- Provide wire mesh cubbies as manufactured by Wirecrafters, Inc., 6208 Strawberry Lane, Louisville, KY, 800-924-9473, or approved equal. Cubbies to be 24" W x 24" H x 24" D with metal hook at the top for the helmets. Cubbies to be 1 ¼" metal framing with 1 ½" square wire mesh, 8 gauge at back, side, top and bottom of each cubbie. All metal to be primed and painted grey. Unit to be secured to wall at rear framing. Unit to have 4" metal support legs. http://www.wirecrafters.com
- Provide one cubbie for each staff member assigned to the station (staff size varies by station) usually a minimum of 40 cubbies. Confirm number with the CR and Fire Department representative.
- Lighting in bunker gear room shall be incandescent lighting. No florescent lighting; it deteriorates the turn out gear fabric. Alternate lighting may be provided if approved, in writing, by the SFFE manufacturer. Room to be equipped with a motion sensor switch without a manual override. Switch must keep lights on during room occupancy only.
- Provide 1-1/2" diameter steel pipe hanging rod supported by heavy duty metal brackets to serve as the rack to hang up turn out gear coats. Coat rack will need to provide room for approximately 40 turn out coats at all times; allow approximately 1 linear foot per coat. Can be one rod or multiple rods depending on the layout. Must be able to support the gear even when still wet.
- Provide adequate ventilation to this area since turn out gear may be returned to this area while still damp and smoky.
- Provide independent dehumidification and exhaust ventilation for this space.

MEDICAL: CLEAN STORAGE – Provides space to store disposable supplies for EMS such as bandages and other non-regulated types of items.

- Provide lockable space for storage of medical equipment and supplies.
- Provide 3 lockers and locks (see General Specifications).

GENERAL STORAGE ROOM – Provides general storage space for items such as holiday decorations, surplus supplies, etc.

- Provide two (2) wall mounted wire shelving units. Shelving to be 2'0" D x 3'0" W x 6"0" H. Provide 3 shelves per unit. (see Chapter 1.E)

DECONTAMINATION ROOM – Space for cleaning of any equipment that might have become contaminated on a scene. Must comply with the requirements in NFPA 1581, Chapter 5, Section 5.7, Section 5.8, Section 5.9.

- All countertops and cabinets shall be stainless steel as listed under General Specifications.
- Provide deep double bowl integral sinks.
- Provide sprayer type faucet at both the sinks and the contaminated equipment cleaning station (shower). Can be same as specified in KITCHEN/PANTRY.
- Provide two (2) wire shelving units 1'0" D x 4'0" W x 3'0" H with three (3) shelves per unit. (see Chapter 1.E)
- Provide a contaminated equipment cleaning station (shower) for the wash down of larger items. Faucet to have a hand held spray head with a hose length of 4' minimum.
- Floor to be non-slip epoxy with integral cove base.
- All outlets to be GFCI and should be located approximately 4' A.F.F. Check with FD representative for location prior to final construction document design.
- Provide floor drains so that entire room can be washed down.
- Ceiling to be moisture resistant.
- Provide adequate ventilation.

- Contaminated Equipment Cleaning Station (shower) shall be labeled as such to avoid any confusion over its use and accessibility requirements (not required to be accessible).

LAUNDRY– This space is for a washer and dryer and should be near or immediately adjacent to the Decontamination room; it must be a separate room. Appliances must be Energy Star Qualified. Must comply with the requirements of NFPA 1581, Chapter 5, Section 5.5.

- Provide heavy duty, residential type Maytag washing machine: model MVWB400VQ; stainless steel tub or an approved equal.
- Provide heavy duty, residential type, Maytag dryer: electric model MEDB 400VQ or MEDB 200 VQ or natural gas model MGDB 400 VQ or MGDB 200 VQ or an approved equal. http://www.maytag.com

3. PUBLIC/ADMINISTRATION

WATCH AREA - Area for communications equipment including networked computer, phone system, tear and run printer and radio system. This area should accommodate two and a half cubicles with two cubicles being work areas and the open half for equipment.

- Provide a minimum of four (4) dedicated 20A circuits for equipment as well as circuits for general use.

ADA TOILET/BATH ROOMS. All bathrooms must comply with NFPA Chapter 5, Section 5.4. Space needs analysis calls for two, a male and a female; a single unisex room is acceptable.

- All fixtures must have automatic flush valves and faucets.
- Each fixture must have an independent water supply cut off and each area must also have an independent cut off. (see Chapter 1.E)

KITCHEN W/PANTRY

- Kitchen must comply with the requirements of NFPA 1581, Chapter 5, Section 5.2.
- Provide stainless steel upper and lower cabinets as well as countertops with integral sinks. Kitchen must be ADA compliant but in addition to a sink that is compliant, provide a deep sink for cleaning large cookware; stew pots, fry pans, etc. Faucet to be a Krowne Pre-Rinse, 8" center, wall mount, model # 17-108W with add on faucet (12"spout) model # 21-139 and Spray Valve assembly model # 21-130 or an approved equal. http://www.krowne.com
- Provide a garbage disposal.
- Provide Vulcan range model G48S-4FT24, 48" natural gas, restaurant range with four (4) open burners, 24" griddle and one (1) large standard oven with emergency gas shut off option as manufactured by Vulcan-Hart, Baltimore, MD, 866-988-5226 or customer service 800-888-1984, ext.14 or approved equal. http://www.vulcanhart.com
- Provide stainless steel commercial hood above stove with a wet chemical extinguishing system. Must be in compliance with NFPA 17A, *Standard for Wet Chemical Extinguishing Systems* and NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*.
- Provide model #D3251HDSS dishwasher as manufactured by Asko, AM Appliance Group, Richardson, TX, 800-898-1879, or approved equal. Stainless steel, ADA compliant. http://www.askousa.com
- Provide Model T-35 refrigerator as manufactured by True Manufacturing, O'Fallon, MO, 800-325-6152, or approved equal. Stainless steel, two solid doors, 35 cubic feet, 39.2" L x 29.5" D x 78.25" H. http://www.truemfg.com
- Provide Model TUC-27F-LP under counter freezer as manufactured by True Manufacturing, O'Fallon, MO, 800-325-6152, or approved equal. ADA compliant, low profile, 27-5/8" L x 30-1/8" D x 29-3/4" H with 1-3/4" H castors. http://www.truemfg.com
- Provide ice machine Model # QD-0133W as manufactured by Manitowoc Ice, Inc., 2110 S 26th Street, Manitowoc, WI, 54220, 1-800-545-5720, or approved equal. Air cooled, diced cubes, 147 pounds per day, 38.5" H x 26.5" D x 26" W. http://www.manitowocice.com

- Provide countertop microwave Model #JE2160SF as manufactured by GE or approved equal. Stainless steel. http://www.geappliances.com
- Provide floor drain.
- Provide a non-skid epoxy floor system with integral cove base on all walls. (see Chapter 1.E)
- Provide vinyl cove base at cabinet toe kick.
- Provide four (4) Penco lockers with four (4) shelves each, including locks. Provide flat tops with stainless steel wall cabinets above for additional storage. (see Chapter1.E)
- Provide a Bunn Model # Axiom 15-3 1L/2UF PF, 120V, Automatic coffee maker or an approved equal. http://www.bunncoffeemakers.net
- Provide Broilmaster grill; Patio base #BPB26, Grill Head (Natural Gas) #P3SN, front shelf # FKBLACK, two (2) side shelf (one each left and right) #SKRBLACK or approved equal. Install near patio adjacent to the kitchen.
  http://www.broilmaster.com

DINING – This area should be adjacent to the Kitchen and the spaces can be combined as long as a good workflow for the Kitchen is provided. Dining Table provided by the Fire Department is usually one (1) each; 4' by 8' and 4' by 4'. Allow space for at least 12 chairs with tables.

DAY ROOM – This room is used to watch TV and relax.

PRIVATE TV ROOM/QUIET ROOM – This is a smaller room to watch TV or read.

MISCELLANEOUS – These little 'nooks' can be created in various places as suggested below.

- Coffee bar – Can be in Dining or Day Room area and preferably in between and convenient to both. The purpose is to provide a convenient area to get coffee without causing any congestion in the Kitchen. Provide a stainless steel base cabinet with a combination of drawers and shelves (no overhead cabinet). This area will serve as a coffee bar so provide a countertop deep enough (usually 24") for a Bunn commercial coffee machine (For model #, see KITCHEN W/PANTRY). The coffee bar should be convenient to both the Dining and Day Room areas to avoid congestion in the kitchen.
- Popcorn Machine – provide a space and electrical for a countertop popcorn machine. Should be located convenient to the Day Room. Could possibly combine with Coffee Bar area if it is centrally placed.
- Radio Charging Station – Provide an area with plenty of electrical outlets and a countertop space to provide a location for the radio chargers to sit. Should be located near Watch area. Must have a 20A dedicated circuit. Can be combined with Popcorn machine area.
- Vending Machine Area – provide a place to install a beverage and snack vending machine. This area can be located just about anywhere in the building (not in the apparatus bays) but should not be placed too close to sleeping quarters.

4. PRIVATE/LIVING AREAS

All bunkrooms must comply with the requirements of NFPA 1581, Chapter 5, Section 5.3. and T.C.A. 4-24-301:303.

CAPTAIN'S BUNK ROOMS W/SHARED BATH (2) - This is two bunk rooms with a shared bathroom, including a shower, between them. These rooms are "employee access only"; no public access at any time.

- Provide space for a small desk in each bunk room
- Provide four (4) Penco lockers with two (2) shelves, coat hook, locks, and slanted tops in each bunk room.
- Provide space for twin bed in each.
- Provide a shelf above each bed (lengthwise) with an outlet above and an under-counter light.
- Provide a non-slip epoxy floor system in the shared bathroom.

- Provide all necessary toilet accessories including grab bars, robe hooks, towel bars and mirrors.

BUNK ROOMS (2) – Each of these rooms should provide divided sleeping areas for five (5) firefighters.

- Provide concrete block divider walls between each sleeping space with a cap of durable material such as solid core surfacing.
- Provide space in each sleeping space for a twin bed.
- Provide a shelf above each bed (lengthwise) with an outlet above and an 18" fluorescent under-counter light on an independent switch.
- Provide low level low lighting in several areas (less than 2'0" A.F.F).
- Provide space for small desk.

EMS BUNK ROOM – Provide a bunk room for EMS staffing of (2) people per shift.

- Provide concrete block divider walls between each sleeping space with a cap of durable material such as solid core surfacing.
- Provide space in each sleeping space for a twin bed.
- Provide a shelf above each bed (lengthwise) with an outlet above and an 18" fluorescent under-counter light on an independent switch.
- Provide low level low lighting in several areas (less than 2'0" A.F.F).
- Provide space for small desk.

MALE SHOWER/BATHROOM/LOCKER ROOM – Shower, restroom facilities and lockers for male employees.

- Toilet partitions to be stainless steel.
- Provide all necessary toilet accessories including grab bars, robe hooks, towel bars and mirrors.
- Provide hand dryer as specified in General Specifications.
- Provide floor drain.
- Provide forty (40) Penco lockers for firefighters and EMS personnel. Lockers to have two shelves, coat hook, locks, and slanted tops.
- Provide benches including an ADA compliant bench.

FEMALE SHOWER/BATHROOM/LOCKER ROOM – Shower, restroom facilities and lockers for female employees.

- Toilet partitions to be stainless steel.
- Provide all necessary toilet accessories including grab bars, robe hooks, towel bars and mirrors.
- Provide hand dryer as specified in General Specifications.
- Provide floor drain.
- Provide twelve (12) Penco lockers for firefighters and EMS personnel. Lockers to have two shelves, coat hook, locks, and slanted tops.
- Provide benches including an ADA compliant bench.

EXERCISE ROOM – Room to provide opportunity for physical fitness training; must be large enough to accept the equipment listed below and allow for sufficient circulation around the equipment. See specifications for specific equipment information.

- Provide floor to ceiling wall to wall mirror on one wall.
- Provide 3/8-inch thick Tuff Roll resilient athletic flooring as manufactured by Kiefer Specialty Flooring, Zion, IL, 800-322-5448, or approved equal. Color No. 10 Blue, tape down at seams.
- Ceilings to be a minimum of 9'-0" to accommodate exercise equipment.
- Exercise equipment list:

    1. Treadmill
    2. Elliptical
    3. Exercise bike
    4. Crossover (multi-function trainer)

5. 4-stack Gym
6. Set of hand dumbbells

5. MISCELLANEOUS SPACES

CUSTODIAN/JANITOR'S CLOSET – Place to store extra cleaning and paper supplies as well as mops, brooms, etc. This room is accessible to station staff at all times; door hardware shall be passage-no locks. Room is best located adjacent to the kitchen.

- Provide mop sink.
- Provide mop & broom rack.
- Provide chrome plated wire shelving unit as specified in General Specifications. Size to be 2'-0" D x 3'0" W x 6'-0" H with 6 shelves. (2 units with 3 shelves each)
- Provide floor drain.

MECHANICAL ROOMS

- Water heaters to be Rinnai instantaneous gas fired units, or an approved equal. Can be mounted inside the building or use models approved for outdoor use.
- HVAC room to be located on an outside wall with exterior access. Door must be oversized. (see Chapter 1-D.) HVAC only in this room; no other equipment.

SPRINKLER ROOM

Space for the sprinkler riser system. Must comply with NFPA 13, *Standard for the Installation of Sprinkler Systems.*

OUTDOOR STORAGE ROOM – This area is for storing items such as a lawn mower, gas, trimmers, etc. Can be a separate structure or attached to building if permitted by codes.

- Must have a six foot (6') roll up door with locking hardware for BEST padlock.
- Provide BEST Padlock Model # 21B722-LPS2122 order # 29009-67924.
- Must have none sparking light fixture and switch.
- There is no conditioned air in the space; heated or cooled.
- Does this space need to have blast resistant light fixtures?
- Provide a storage cabinet for flammable/hazardous fluids: capacity 30 Gal., ht 44 In., width 43 In., depth 18 In. Manual, 2-door, recessed handle, padlock, color yellow, unitized welds, double wall 18 gauge steel shelves construction, number of shelves 1, additional shelf 1YNH7. For use with segregation and expansion storage of Flammable and Hazardous Materials. Meets OSHA/NFPA Standards. Brand: JUSTRITE, Model # 89300 or an accepted equal; available from Grainger Supply. http://www.grainger.com

LOW VOLTAGE ROOM – Space for data, data cable/equipment ladder rack, phone, radio equipment and thermostats. CATV connections will be in this room with any amplifiers necessary to boost signal throughout the building. Metro Information Technology Department (Metro IT) and Metro General Services, Radio Shop will determine location of installed equipment. Contractor must check with both agencies for proper location of devices and equipment within this room. The ceiling and floor are to be left unfinished (floor to be sealed) unless there is a possibility of dust/dirt intrusion into the room. Additional specifications may be provided by Metro IT.

- Provide six (6), 120V, 15A dedicated circuits for equipment in this room. Outlet locations to be field determined by agencies listed above.
- Provide four (4) 120V convenience outlets; one on each wall. Can be on same circuit.
- Provide one, 208V, 30A dedicated circuit for UPS. UPS will have NEMA L6-30 connector. Location to be determined by the representative from Metro Information Technology Department.
- Provide three (3), four inch (4") conduits for building entrance service access with pull strings. If a two story structure must have four (4), four inch (4") sleeves between floors.
- Must have an isolated earth ground. Provide at least one #6 AWG bare copper wire connected to busbars. Must meet NFPA 70 and Telecommunications Industry

Association standard ANSI/J-STD-607-A (October 2002) grounding and bonding specifications.

- Provide 2 busbars; minimum size 6 mm thick by 50 mm wide (1/4" thick by 2" wide) with a minimum of 6 connection points each.
- Wall fields to be covered with 4' by 8' by ¾" plywood painted with grey fire retardant paint; must be installed with bottom edge 24" AFF.
- BTU requirements are 10,361 BTU/H. Network and voice requires approximately 2,500 BTU/H.
- Operating temperature range is 32 to 104 degrees F; Normal 75 degrees F.
- Humidity-normal 55% relative; maximum is 95%.
- Provide adequate ventilation for the equipment; HVAC should demand cool air only, NO HEAT.
- Provide an independent, hotel style, air conditioner.
- Fire suppression equipment as required by code.
- Door to have card key access. Provide conduit for card reader. The door shall be a minimum of 910 mm (36 in) wide and 2,000 mm (80 in) high, without doorsill, hinged to open outward.
- Lighting shall be a minimum of 500 lx (50 foot candles) measured 1 m (3 ft) above the finished floor, mounted 2600 mm (8.5 ft) minimum above finished floor.

6. EXTERIOR

- Provide "dusk to dawn" exterior lighting at building, parking areas, and for exterior elements such as monument sign and flagpole.
- Parking must be designed to handle double occupancy during shift changes.
- Provide single halyard aluminum flagpole with an exposed height of 30'-0".
- Provide a mailbox.
- Provide monument sign using materials and design to blend with the character and materials used for the building.
- All doors used as an "emergency exit only" shall have no hardware or penetrations on the exterior of the door.
- Provide dumpster pad and enclosure per codes.
- Slopes on ramps leading into and exiting out of apparatus bays shall be gentle and kept to a bare minimum. Apparatus is low to the ground, in some cases there is -6" clearance. See NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas*, Chapter 5. Detailed apparatus specifications are available from the Fire Department representative.
- Provide landscaping that is attractive and low maintenance using native and indigenous materials to the extent possible.
- Select trees and shrubs that produce little or no debris. Avoid using plants that produce fruits or nuts that attract unwanted animals and birds.
- The growth characteristics of selected plant material should be assessed when considering line of site requirements. Most critical area is the emergency vehicle ramp; vegetation can not restrict the view of the apparatus operator when responding to a call for service.
- Provide a patio with convenient access from the Kitchen.
- Smokers must remain 25'-0" from the building (door), provide covered patio to allow covered smoking area.
- Provide natural gas connection for grill; adjacent to kitchen and/or near the covered patio. See KITCHEN/PANTRY for grill specifications.
- Provide a low screen wall and landscaping to 'shield' the patio from neighbors.
- Exterior to blend with neighborhood and have a residential feel.
- Exterior to be brick or a combination of brick with block, stone or pre-cast.
- Provide metal roof and gutter system with deductive alternate for asphalt shingle roof.
- Provide conduit and any other requirements for an Owner installed exterior emergency call box (phone).
- Provide Communications Tower: If required at the site, provide a concrete base and tower for communications equipment using the specifications for N series Tower provided by Nello Corporation or an approved equal. (See specifications.) Installation

and grounding: All work shall conform to the methods and procedures described in the Motorola document *Standards and Guidelines for Communications Sites* (Motorola Part Number 68-81089E50), commonly referred to as Motorola Standard R56. Electrical work shall meet requirements of the most current edition of NFPA 70, the National Electrical code.

- Provide a sprinkler system for landscaping. It is desirable that storm water run off be captured and used for as a water supply for the sprinkler system; provide cost as an alternate to using the domestic water supply.

ATTACHMENTS